

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2006/003203

International filing date (day/month/year)
27.01.2006

Priority date (day/month/year)
27.01.2005

International Patent Classification (IPC) or both national classification and IPC
INV. H04B7/005 H04B7/06 H04B7/08

Applicant
QUALCOMM INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of
this opinion

see form
PCT/ISA/210

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 33-40

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☒ no international search report has been established for the whole application or for said claims Nos. 33-40

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13ter.1(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-bis of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:
- ☐ paid additional fees
 - ☐ paid additional fees under protest and, where applicable, the protest fee
 - ☐ paid additional fees under protest but the applicable protest fee was not paid
 - ☒ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-32

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	2,3,5-7,20,21
	No: Claims	1,4,8-19,22-32
Inventive step (IS)	Yes: Claims	
	No: Claims	2,3,5-7,20,21
Industrial applicability (IA)	Yes: Claims	1-32
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item IV.

The separate inventions/groups of inventions are:

Claims 1-32

Method and apparatus for calibrating communication links.

Claims 33-40

Simplified channel estimation using spatial processing.

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

Subject 1 is related to a method of calibrating communicating links in a wireless time division duplexed communication system and an apparatus having means for carrying out the method.

Subject 2 is related to a simplified channel estimation. This step is done after the step of calibration. The description specifies clearly on page 27, paragraph 0091, that "this simplification is possible after calibration has been performed to account for differences in the transmit and receive chains.". The prior art document US-A-20040085939 also teaches that the spatial processing is performed after the calibration. On one hand claims 33 to 40 are silent about calibration, on the other hand any other calibration as the one claimed in claim 1 e.g can be performed before the channel estimation.

Since the problems to be solved are different and the features solving them are different, the present application lacks unity. Further all the features of claim 1 of the present application are known from US-A-20040085939 (see e.g. claim 1 of the cited document), so that no inventive link can be found between the two subjects.

Re Item V.

1 Reference is made to the following documents:

- D1 : US 2004/085939 A1 (WALLACE MARK S ET AL) 6 May 2004 (2004-05-06)
D2 : US 2003/002450 A1 (JALALI AHMAD ET AL) 2 January 2003 (2003-01-02)
D3 : US 2001/048675 A1 (NAFIE MOHAMMED ET AL) 6 December 2001 (2001-12-06)

2 INDEPENDENT CLAIM 1

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D1 (see e.g. claim 1, or e.g. [0051]) discloses all the features of present claim 1.

2.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D2 (see e.g. the combination of claim 1 and claim 2) discloses all the features of present claim 1.

2.3 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D3 (see paragraphs [0004] "The master can estimate ... , and so forth.", [0005] "The master needs ... to the slave (... STD).", [0015] ", the master sends a packet to the slave which the slave uses to measure the downlink channel" and [0019]) discloses all the features of present claim 1

3 INDEPENDENT CLAIM 17

Apparatus claim 17 corresponds to independent method claim 1. Therefore, the

statements regarding to claim 1 applies also to claim 17.

Thus, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 17 is not new in the sense of Article 33(2) PCT over documents D1 to D3.

4 INDEPENDENT CLAIM 24

Method claim 24 differs from method claim 1 in that it specifies the use of a pilot on the first communication link and a pilot on the second communication link.

- 4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 24 is not new in the sense of Article 33(2) PCT.
Document D1 (see e.g. claim 18) discloses all the features of present claim 24.
- 4.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 24 is not new in the sense of Article 33(2) PCT.
Document D2 (see e.g. paragraph 0043 "based on the pilot reference transmitted by the terminal. ... based on the pilot transmitted by the base station.") discloses also the use of a pilot in a first and a pilot in a second communication link.

5 INDEPENDENT CLAIM 28

Apparatus claim 28 corresponds to independent method claim 24. Therefore, the statements regarding to claim 24 applies also to claim 28.

Thus, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 28 is not new in the sense of Article 33(2) PCT over documents D1 or D2.

6 DEPENDENT CLAIMS 2-16, 18-23, 25-27, 29-32

Dependent claims 2-16, 18-23, 25-27, 29-32 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

Dependent claims 2 and 3

According to fig. 1 of D1 and fig. 1 to 4 of D2, the skilled person would regard the features disclosed in claims 2 and 3 as a normal design procedure.

Dependent claims 4 and 9 to 16

The subject matter of claims 4, 9 - 16 are known from e.g. D1 (see claims 4 to 8 and 13 to 16).

Dependent claims 5 to 8

Equations (1) to (6) according to the present description correspond exactly to equations (1) to (6) disclosed in D1 (see e.g. paragraphs [0026], [0033] [0040], [0041], [0043] and [0044]). Regarding the present description, the subject-matter of claims 5 to 8 constitute only mathematical know-how and mathematical optimisation.

Dependent Claims 18 to 23 correspond to claims 2, 3, 8 and 12 (or are known partially from D1, see claims 19 to 21).

Dependent claims 25 to 27 correspond to claims 2 and 3 or are known from D1 (see e.g. claim 21).

Dependent claims 29 to 32 correspond to claims 2, 3, 8 and 12.